

REMARKS

Pursuant to the present amendment, claims 1, 4, 19, 21, 22, 26, 27, 29, 31, 33, 35, 36, 39, 40, 43 and 45 have been amended and claims 3, 20, 24, 25, 28, 37, 38, 44, 46 and 47 have been canceled. Thus, claims 1-2, 4-19, 21-23, 26-27, 29-36, 39-43 and 45 are pending in the present application. No new matter has been introduced by way of the present amendment. Reconsideration of the present application is respectfully requested in view of the amendments and arguments set forth herein.

Pursuant to the present amendment, claim 47 has been canceled as it is directed to a non-elected invention that was the subject of a previous restriction requirement. Applicants specifically reserve the right to pursue the subject matter defined by now-canceled claim 47 in a later filed application should they so desire.

In the Office Action, claims 1-9, 14-16, 18-22, 24-30, 35-41 and 43-46 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by Taylor '384 (U.S. Patent No. 6,319,384). Claims 1-9, 14-15, 18-30, 35-40 and 43-46 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by Taylor '144 (U.S. Patent No. 6,750,144). Claims 10-13 and 31-34 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Taylor '384 in view of Piersol (U.S. Patent No. 1,785,389). Claims 17, 23 and 42 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Taylor '384 in view of Taylor '528 (U.S. Patent No. 6,309,528). Claims 10-13 and 31-34 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Taylor '144 in view of Piersol. Claims 16-17 and 41-42 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Taylor '144 in view of Taylor '528. Applicants respectfully traverse the Examiner's rejections.

As the Examiner well knows, an anticipating reference by definition must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. *In re Bond*, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). To the extent the Examiner relies on principles of inherency in making the anticipation rejections in the Office Action, inherency requires that the asserted proposition necessarily flow from the disclosure. *In re Oelrich*, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981); *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1463-64 (Bd. Pat. App. & Int. 1990); *Ex parte Skinner*, 2 U.S.P.Q.2d 1788, 1789 (Bd. Pat. App. & Int. 1987); *In re King*, 231 U.S.P.Q. 136, 138 (Fed. Cir. 1986). It is not enough that a reference could have, should have, or would have been used as the claimed invention. “The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *Oelrich*, at 326, quoting *Hansgirk v. Kemmer*, 40 U.S.P.Q. 665, 667 (C.C.P.A. 1939); *In re Rijckaert*, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993), quoting *Oelrich*, at 326; see also *Skinner*, at 1789. “Inherency ... may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *Skinner*, at 1789, citing *Oelrich*. Where anticipation is found through inherency, the Office’s burden of establishing *prima facie* anticipation includes the burden of providing “...some evidence or scientific reasoning to establish the reasonableness of the examiner’s belief that the functional limitation is an inherent characteristic of the prior art.” *Skinner* at 1789.

Moreover, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim

limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); M.P.E.P. § 2142. Moreover, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); M.P.E.P. § 2143.03.

With respect to alleged obviousness, there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561 (Fed. Cir. 1986). In fact, the absence of a suggestion to combine is dispositive in an obviousness determination. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573 (Fed. Cir. 1997). The mere fact that the prior art can be combined or modified does not make the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01. The consistent criterion for determining obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); *In re O'Farrell*, 853 F.2d 894 (Fed. Cir. 1988); M.P.E.P. § 2142.

Pursuant to the present amendment, independent claims 1 and 19 have been amended to describe very specific methods that may be employed with respect to the formation of a layer of metal on a semiconductor structure. More specifically, amended claim 1 recites the steps of,

among other things, applying in a first time interval a first current flowing from the electrode through the electrolyte to the semiconductor structure, the first current having a first amperage comprising a plurality of first positive pulses, each of which are applied for a first time duration, and a plurality of first negative pulses, an integral of the first amperage over the first time interval having a first value greater than zero, wherein each of the plurality of first negative pulses are applied for a second time duration that is less than the first time duration. Amended claim 1 also involves applying in a second time interval a second current having a second amperage comprising a plurality of second negative pulses, each of the plurality of second negative pulses having an absolute value that is greater than the absolute value of the plurality of first negative pulses.

Amended claim 19 recites the steps of, among other things, providing a semiconductor structure comprising at least one recess and at least one elevation, performing an electroplating process on the semiconductor structure for depositing a layer of metal on the semiconductor structure and for filling the at least one recess with the metal, wherein the electroplating process is performed by applying in a first time interval a first current flowing from an electrode through an electrolyte to the semiconductor structure, the first current having a first amperage comprising a plurality of first positive pulses and a plurality of first negative pulses, an integral of the first amperage over the first time interval having a first value greater than zero. Amended claim 19 also involves, after performing the electroplating process, performing an electropolishing process on the semiconductor structure for preferentially removing a portion of the layer of metal from the at least one elevation, wherein the electropolishing process is performed by applying in a second time interval a second current flowing from the electrode through the electrolyte to the semiconductor structure, the second current having a second amperage comprising a plurality of

second negative pulses, each of the plurality of second negative pulses having an absolute value that is greater than an absolute value of the plurality of first negative pulses, an integral of the second amperage over the second time interval having a second value less than zero, and, after performing the electropolishing process, performing a chemical mechanical polishing process on the semiconductor structure, the chemical mechanical polishing process removing a surplus of the layer of metal from the at least one elevation and planarizing a surface of the semiconductor structure.

At no point does the art of record disclose or suggest the claimed invention as recited in amended independent claims 1 and 19. Among other things, amended claim 1 recites that the duration (second time duration) of the negative pulses during the first time interval is less than the duration (first time duration) of the positive pulses during the first time interval. This is directly contrary to the teachings of Taylor '384 (Col. 7, ll. 26-37; Col. 8, l. 59 – Col. 9, l. 4; Figure 1) and Taylor '144 (Col. 4, ll. 44-49; Figure 1), wherein the negative pulses are applied for a greater duration than the positive pulses, *e.g.*, note the respective pulse widths.

Amended claim 19 is likewise allowable over the prior art of record. Among other things, the identified references do not disclose or suggest a method in which the absolute value of the plurality of second negative pulses (of the second current) is greater than the absolute value of the plurality of first negative pulses (of the first current). Additionally, the art of record does not disclose or suggest the precise order of the steps recited in claim 19. For at least these reasons, it is respectfully submitted that independent claim 19, and all claims depending therefrom, are in condition for immediate allowance.

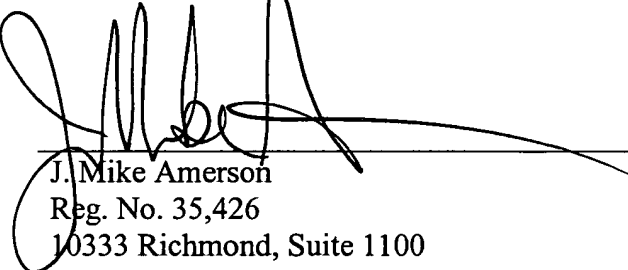
Moreover, there is no suggestion to modify the teachings of Taylor '384 or Taylor '144 so as to arrive at Applicants' invention. In fact, the methodology disclosed in these references

appears to teach opposite to the claimed invention set forth in claim 1. A recent Federal Circuit case makes it crystal clear that, in an obviousness situation, the prior art must disclose each and every element of the claimed invention, and that any motivation to combine or modify the prior art must be based upon a suggestion in the prior art. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Conclusory statements regarding common knowledge and common sense are insufficient to support a finding of obviousness. *Id.* at 1434-35. It is respectfully submitted that any attempt to assert that the invention defined by independent claim 1 is obvious in view of the prior art of record constitutes an impermissible use of hindsight using Applicants' disclosure as a roadmap.

For at least the aforementioned reasons, it is respectfully submitted that all pending claims are in condition for immediate allowance. The Examiner is invited to contact the undersigned attorney at (713) 934-4055 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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